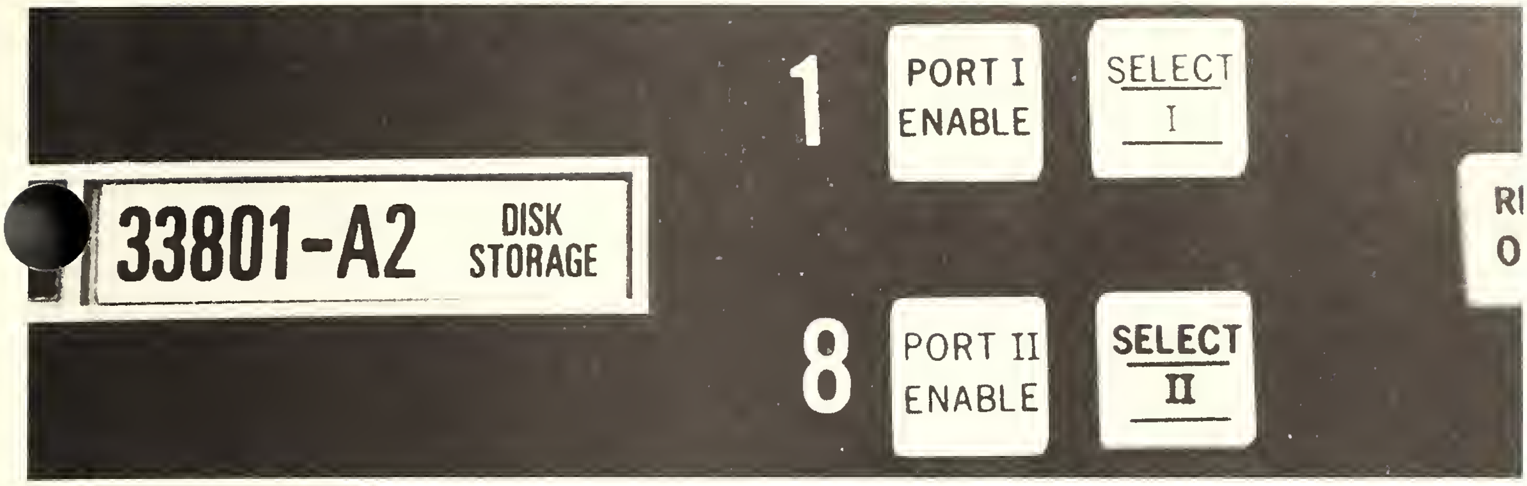

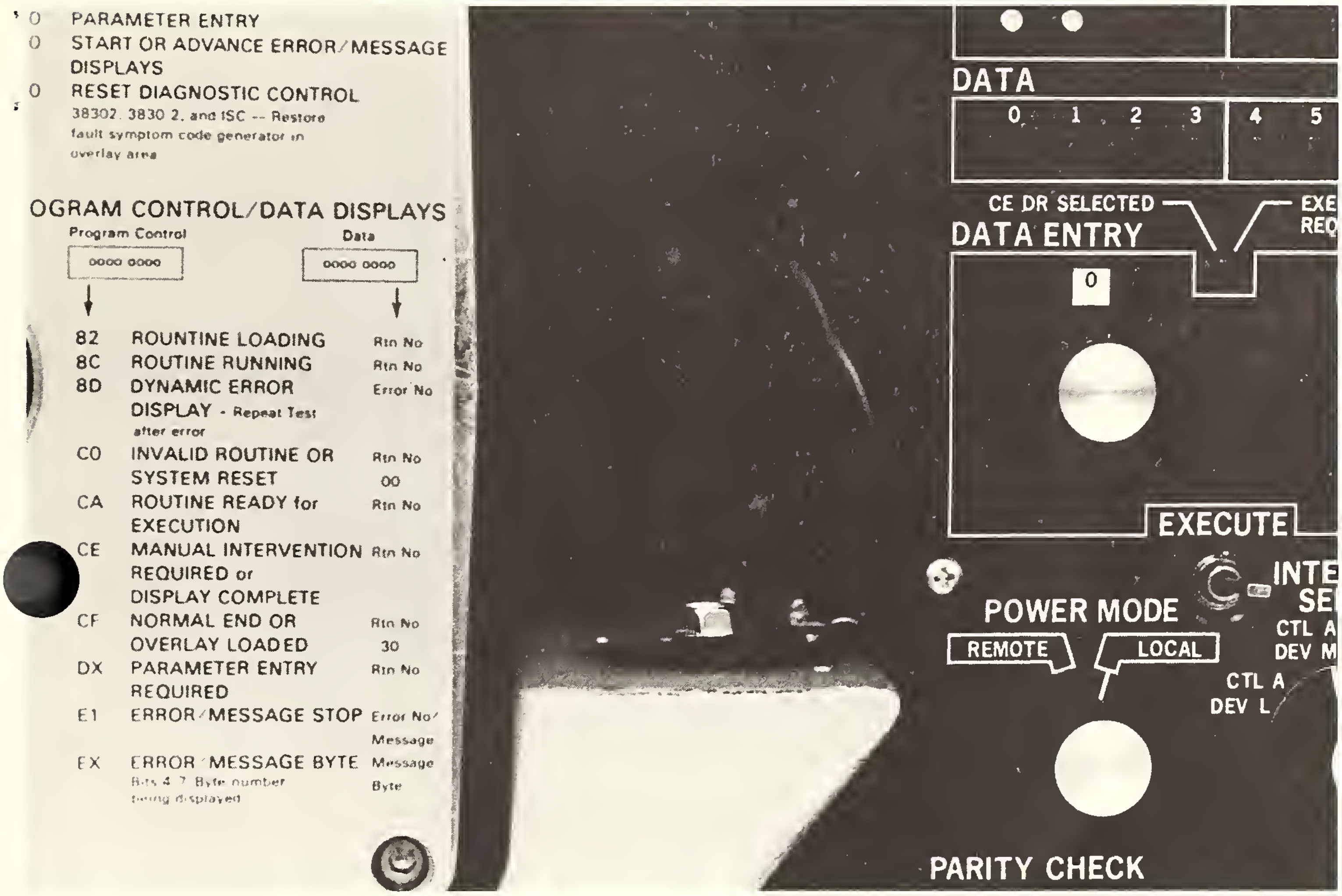
PARAMETER ENTRY
START OR ADVANCE ERROR/MESSAGE DISPLAYS
RESET DIAGNOSTIC CONTROL
OGRAM CONTROL/DATA DISPLAYS
Program Control
Data
82 ROUNTINE LOADING Rtn No
8C ROUTINE RUNNING Rtn No
8D DYNAMIC ERROR DISPLAY - Repeat Test after error Error No
C0 INVALID ROUTINE OR SYSTEM RESET Rtn No 00
CA ROUTINE READY for EXECUTION Rtn No
CE MANUAL INTERVENTION REQUIRED or DISPLAY COMPLETE Rtn No
CF NORMAL END OR OVERLAY LOADED Rtn No 30
DX PARAMETER ENTRY REQUIRED Rtn No
E1 ERROR/MESSAGE STOP Error No/Message
EX ERROR/MESSAGE BYTE Message Byte
DATA
0 1 2 3 4 5
CE DR SELECTED
DATA ENTRY
EXECUTE
POWER MODE
REMOTE
LOCAL
PARITY CHECK

University of Toronto

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Janet Barr, Editor

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3380 DISK UPGRADES REDUCE COSTS AT UTCS

Over the Dominion Day holiday, personnel from UTCS and Control Data Canada Limited completed the conversion of disk storage from 3330-11 equivalent mountable disks to CDC 3380 non-removable disk assemblies. As a result of this conversion, the majority of on-line disk storage now resides on non-removable media for the UTCS IBM 3033 and 3031 Systems.

The concept of non-removable media is not new. Several models have been available for the last few years. Because of the advantages gained by a dust free environment and reduction in wear and tear resulting from the elimination of mounts, the failure incidence of this type of product is greatly reduced. The 3380 device as provided by Control Data Canada Ltd. has been in service on the 3031 since March 12, 1979, with no spindle or disk assembly problems to date. The same performance has been achieved from the 3380s attached to the 3033 during the limited period of service from July 1 to the writing of this article.

The 3380 is a somewhat unique device in that it offers the customer a choice in modes of operation. Depending on the customer's needs, the 3380 may be operated as a 3350-compatible device with a storage capacity of 317.5 megabytes and a track length of approximately 19000 bytes or as a 400 megabyte device with two logical 3330-11 type disk volumes (200 megabytes each) on it and the familiar track length of 13030 bytes per track. UTCS has chosen the latter route for several reasons, some of which are described in the following:

- The conversion was much simpler in that no reblocking of data was necessary.
- There is now a standard track-length throughout the UTCS complex since the elimination of the 2314 mountable service. This has many advantages for both users and UTCS. (Note: ATS remains on 2314 disks; however, this is a self-contained service and users don't 'see' their files at the track level.)
- Backing up the non-removable media onto a 'real' 3330-11 type of disk in the event of a failure is much simpler because, again, no conversions need to be done.
- It was financially advantageous to select this mode of operation which contributed in part to the price reductions described in paragraphs below.

The completion of this conversion is especially significant because it was the final task remaining in our consolidation effort and the final stage of our equipment modernization program. Over the past few months, our disk subsystems have all been upgraded by as many as three generations of technology thus allowing us to provide the user with enhanced reliability, technical advantages

cont'd ...

3380 DISK UPGRADES cont'd

and price/performance improvements as discussed in the paragraphs below.

The DEC user community has not been forgotten in this upgrade program. The UTCS DEC 1090 now uses RP06s which are essentially state-of-the-art products from Digital Equipment Corporation and are comparable with the 3330-11-type devices from a hardware point of view. DEC users will have already noticed the improved reliability of the system resulting from the RP06 upgrade completed in May, 1979.

Reduced Storage Charges

As a direct result of the disk upgrades, UTCS users will enjoy reduced disk storage costs. Disk storage charges will be reduced by approximately twenty-five percent. The reductions are outlined below and will become effective September 1, 1979.

SYSTEM	OLD PRICE	NEW PRICE
IBM 3033	$0.018/trk/day	$0.0135/trk/day
IBM 3031	N/A	$0.0135/trk/day
S/370-165-II		
APL	$0.018/trk/day	$0.0135/trk/day
ATS	$0.018/trk/day	$0.018/trk/day
DECsystem-10		
1,000 blocks	$1.00/day	$0.075/day
Shared Disk	$0.024/trk/day	$0.018/trk/day

There are now standard disk storage charges throughout the IBM systems at UTCS with the exception of the ATS storage which remains at $0.018/trk/day because ATS uses 2314 disks and cannot take advantage of the new 3380 disk assemblies.

Users with large storage requirements on the 3033 or 3031 who are prepared to handle all of their own disk management, now have the opportunity to rent disk space on a Volume per month basis at a rate of $2000/Vol./month. The reduced UTCS overhead associated with these entirely user-managed packs makes it possible for UTCS to offer this storage at the reduced rate.

Users with questions regarding the new disk storage charges are invited to contact their Computing Services Representative.

Derry Cox
Ralph Lombardi

ANNOUNCING A NEW TAPE SERVICE FOR USERS

UTCS is preparing to introduce an improved tape service for Academic users. UTCS tape users will soon be able to use the Tape Management System (TMS), a sophisticated software product distributed by University Computing Company. TMS will give 3033 users more control over their own tapes. Currently, in order to rent a tape, the user must contact the UTCS Tape Librarian during regular office hours. Similarly, the Tape Librarian must be contacted in order to release or scratch a tape. With TMS, users will be able to

cont'd...

NEW TAPE SERVICE cont'd

rent a tape 24 hours a day and will no longer need to contact the Tape Librarian in order to release tapes. Instead, batch and interactive functions will allow the user to control these functions himself. In addition, the user will be able to review or display the status of his tapes whenever he wishes.

TMS has been in use on the UTCS 3031 for almost two years. The 3031 users have found the transition to TMS to be a smooth one and the system has been extremely reliable.

UTCS plans to have TMS operational for 3033 users early in the next calendar year. Now that the two machines (IBM 3033 and 3031) share the same physical location, the UTCS Operations staff and Tape Librarians have already become familiar with TMS, and the Systems Support staff are experienced with TMS concepts and installation. 3033 users should benefit from this already established expertise. The Computing Services Representatives are learning the system now and will be assisting Systems Support in testing and developing user functions

How TMS Works

TMS works on three basic principles:

1. It utilizes the concept of a "scratch pool" of tapes.
2. It ensures that the use of the EXPDT parameter in JCL is enforced.
3. It protects against accidental overwrite of tapes.

To TMS, a scratch tape is a tape which is not owned and therefore the information on the tape may be overwritten. A "scratch pool" is a set of these scratch tapes.

Each tape under TMS contains an expiry date. The expiry date is an important concept. It can be specified in Julian date form (yyddd), where EXPDT=80001 is January 1, 1980. Alternatively, it can be expressed as a "retention period", for example, RETPD=nn, where nn is the number of days the tape is to be kept from the date it was created. Here it is necessary to understand the idea of "creating a tape". The date on which a user creates his first dataset on a tape using disposition of NEW, is the creation date, and remains with the tape until the user scratches (or disowns) the tape. This scratching process is under user control.

All user requests for scratch tapes are serviced from a "scratch pool"; the user does not need a tape slot number. Tapes are arbitrarily assigned from this pool whenever a user requests a scratch tape in the JCL of a job. Once the tape is written, it is returned to its slot in the tape racks but is no longer part of the scratch pool. Tape rental charges are made to the Service Access Code used to write the tape.

The tape returns to the scratch pool when its expiry date is reached. The user originally sets the expiry date by specifying it in the JCL of the job which creates the dataset. UTCS will

cont'd...

NEW TAPE SERVICE cont'd

provide interactive commands and batch procedures to enable the user to change the expiry date for any tapes created under his own Service Access Code.

TMS maintains its own online records for all tapes UTCS supplies to users. For each tape Volume Serial, there is an entry in a dataset giving, among other information, the tape dataset name, creation date, expiry date, and the Service Access Code creating the tape. This is TMS's way of protecting the user. It is impossible to use a tape for scratch before the expiry date has been reached. A tape will not expire until the last file on the tape has expired. Also, the only tapes for which a user can query or modify TMS data, are those created with his Service Access Code. In addition to the above, TMS has facilities which allow the batch or interactive user to obtain information on a specific Volume Serial or on several tapes such as which tapes are due to expire.

TMS Initial Impact on Users

Commencing this September, UTCS staff will be using TMS with a scratch pool containing tapes with completely numeric volume serial numbers. The only potential problem the switch to TMS raises is for users who have tapes in Foreign or "F" slots with the same volume serial numbers as those in the test scratch pool. Users should contact their Computing Services Representative if they have any Foreign tapes with all numeric volume serial numbers.

Due to the small demand for 800 BPI and 7-track tapes, UTCS will not be providing a scratch pool for this type of tape. Users will be able to rent 800 BPI and 7-track tapes through the Tape Librarian but not automatically through TMS.

In summary, UTCS users will be able to control their own tapes on both the 3031 and 3033 once TMS is ready for 3033 users in early 1980. UTCS will be able to reduce I/O errors on tapes by using the TMS facility which schedules regular cleanings for tapes based on the amount of use and elapsed time since the last cleaning. Users will appreciate the reduction in time required in order to acquire and release tapes. The TMS reporting functions will be valuable in tracking tape usage and the end result will be a larger scratch pool due to better tape management. Users will be able to save money on tape rental by releasing a tape as soon as they are finished with it regardless of the time of day.

Overall, TMS is a reliable product, and the added flexibility in tape management will be welcome to UTCS users and staff.

Sue Gardner

STATUTORY HOLIDAYS

The following hours of service will be in effect during the Labour Day holiday period.

cont'd...

STATUTORY HOLIDAYS cont'd

	Sept. 1 (Saturday)	Sept. 2 (Sunday)	Sept. 3 (Monday)
IBM 3033	08:00-20:00	08:00-20:00	closed
S/370-165	08:00-20:00*	08:00-20:00*	unattended
DEC 1090	08:00-20:00*	08:00-20:00*	unattended

*Running unattended outside these hours.

Normal hours of service for all systems will resume Tuesday, September 4, 1979.

NON-CREDIT SHORT COURSES OFFERED BY UTCS

Introduction to Computing With The Statistical Package For The Social Sciences (SPSS)

Prerequisites: Background in Statistics.

Dates: August 13 - August 17

Time: 10:00 A.M. - noon

This course is aimed at statistical users without a computing background. SPSS is an easily learned statistical programming language which contains powerful routines for statistical analysis, while allowing great flexibility in manipulating data, and handling missing observations. The course will be an introduction to SPSS for users who are not familiar with the package, and will include a brief introduction to computing services at University of Toronto Computing Services. If there is sufficient demand, an advanced course for those already familiar with SPSS will also be arranged.

To enrol, register with the UTCS Information Office located in room 206 of the Engineering Annex Bldg., phone 978-4990. Note that while there will be no registration fee, the user will be required to hold a valide UTCS Service Access Code for the IBM 3033 Processor.

Naomi Altman

REPORT ON THE UNIX* CONFERENCE

* UNIX is a Trade/Service Mark of the Bell System. UNIX is a time-sharing operating system and environment that runs on DEC PDP-11 computers with specialized software which provides convenient facilities ranging from general computing to text processing, graphics, music, etc.

The University of Toronto and the Defense and Civil Institute of Environmental Medicine (DCIEM) last month hosted the Summer UNIX Conference here at the University of Toronto. More than 350 people attended the 3 1/2 day conference, coming from as far away as Vienna and Australia. The topics discussed at the conference ranged from operating system changes to games and graphics. Highlights of the conference included graphics demonstrations which were held at the University of Toronto Computer Systems Research Group (CSRG) facility, a software distribution centre, and the first computer

cont'd...

REPORT ON UNIX CONFERENCE cont'd

REVERSI (i.e. Othello) championship.

There were several sessions dealing with languages. The languages discussed included Euclid, a demonstrably secure language being developed at the University of Toronto, C (the backbone language of UNIX) for Z80s and 8080s, and the increasingly popular PASCAL language.

Representatives from Bell Labs. and Western Electric described the latest versions of UNIX. UNIX Version 7 is available and will probably be the last distribution coming out of Bell. V7 boasts the portable C compiler, FORTRAN 77 which compiles to the same C code, the huge filesystem implementation, and Make, a facility to compile programs based on a structured dependency description. V32 which is a version of UNIX that runs on DEC's VAX - 11/780 hardware (32 bit machines) was also announced.

Two users discussed their UNIX environments and the changes which were necessary to support a large user population. The University of New South Wales has an 11/70 which supports 1100 users with an approximate maximum of 40 users on at a time. Purdue's 11/70 supports a user population of 1400 and, this fall, expects to see 80-85 simultaneous, satisfied users.

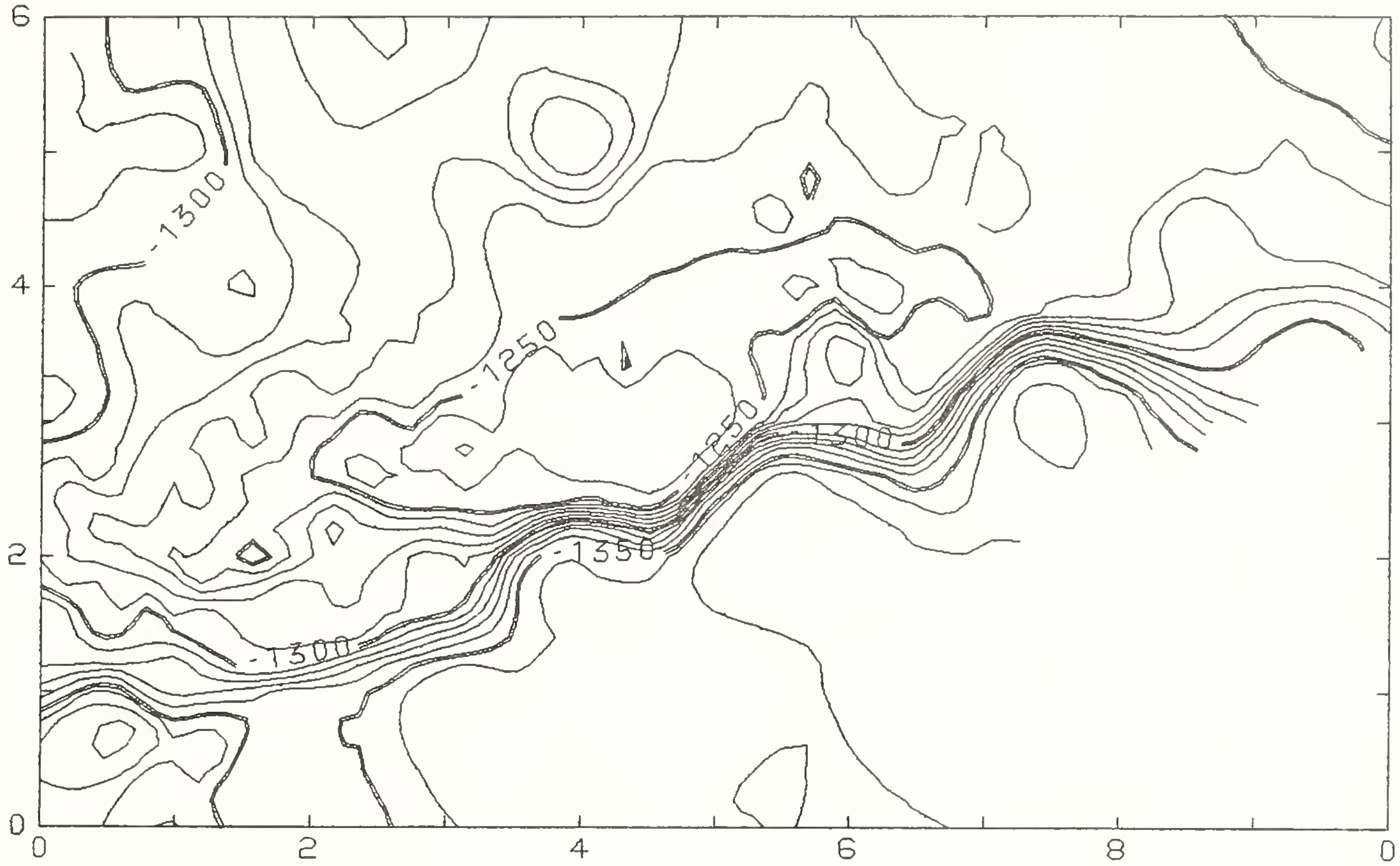
Graphics discussions included talks about the sophisticated environments for general graphical manipulation that exist at DCIEM, CSRG, Johns Hopkins U., New York Institute of Technology (NYIT), and the United States Department of Defense (DoD). Most of these parallel the core graphics proposal of ACM Computing Surveys, December 1978, in particular the DoD implementation. Tom Duff from NYIT presented an entertaining video tape of computer animation which is the raison d'etre of NYIT's Graphics Lab.

A trend that began with the DoD secure UNIX project surfaced at the June Conference with talks on UNIX look-alikes. One of the major problems with UNIX is that the license for its use is very expensive or very restrictive. The development of "Software Tools" and C on other machines provided alternate methods of putting UNIX-like facilities on non-Bell operating systems. Much of this software is available free of charge. Whitesmiths Ltd. of New York City is developing a complete UNIX look-alike which is expected to be available by this fall. It will be called IDRIS after the Persian deity of toolsmiths.

Other topics covered at the conference included UNIX database systems, UNIX for the LSI-11, networking UNIX, formal User Group news, and Real-Time UNIX. The next conference is scheduled to be held in Boulder, Colorado January 29 through February 2, 1980.

A copy of the Summer UNIX Conference Proceedings is available for reference at the UTCS Information Office located in the Engineering Annex Bldg. room 206.

Gregory Hill



LANSING STRUCTURE - CONTOUR

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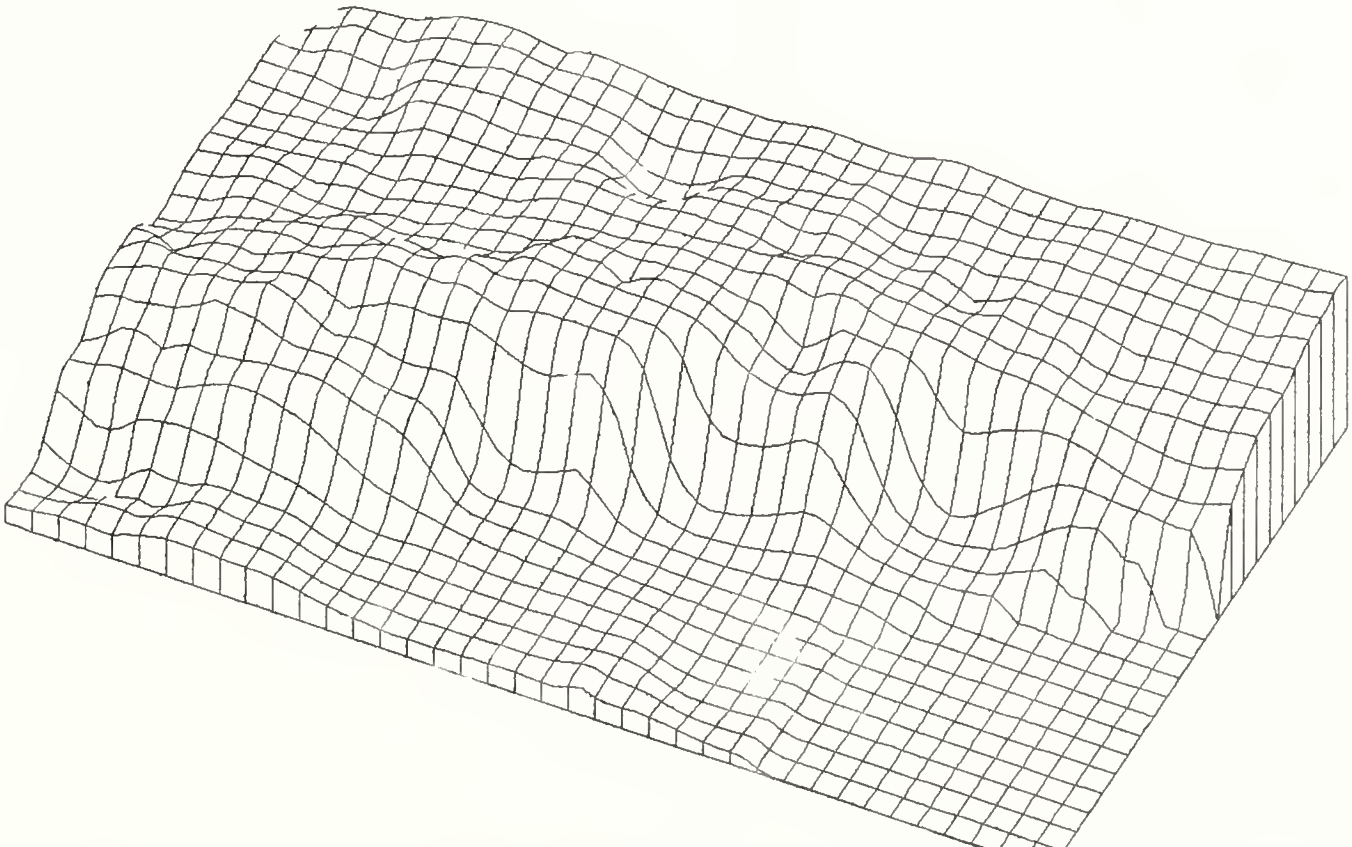

LANSING STRUCTURE - TRANSECT

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SURFACE II GRAPHICS SYSTEM

The SURFACE II graphics system is now available on the UTCS General Purpose Job Stream. The system, which was developed at the Kansas Geological Survey, Lawrence, Kansas, will display spatially distributed data in graphical form and will handle data in which two orthogonal coordinates uniquely determine a third. SURFACE II is generally used to display geographic or demographic data and it can produce contour maps on both the printer and the GOULD plotter. SURFACE II can also be used to produce posting values and perspective block diagrams (also called transect or fish net plots). Maps, geological survey data, and archaeological data can all be plotted using the SURFACE II package. The package has applications in both the physical and social sciences, as it allows the user to reduce complex numerical data to a more comprehensible graphical representation.

Users of the SYMVU and SYMAP packages should be especially interested in SURFACE II. However, unlike the SYMVU and SYMAP packages, SURFACE II will not handle user defined functions and will only handle coordinate data. This data can easily be generated by the user and stored in a temporary or permanent dataset.

Samples of contour and transect plots produced using SURFACE II appear before this article. Details on SURFACE II can be found in the manual SURFACE II GRAPHICS SYSTEM which is available for reference at the UTCS Information Office.

Mark Tapia

PROGRAMMING TIPS FOR 3033 USERS

Users of the UTCS IBM 3033 Processor who are unfamiliar with MVS may be able to make more efficient use of the system by making a few simple changes to their programs.

Many users make the error of specifying a REGION size on their JOB or EXEC statements that is much larger than what their program actually requires. This error can result in a significant increase in the amount of paging being done on their program. It should be remembered that in MVS, the REGION parameter only limits variable and conditional storage requests. Unconditional storage requests (e.g. requests for I/O file buffers etc.) are usually honoured by the system up to a value of 64K.

The same advice applies to TSO users who log onto the system with larger REGION sizes than they require. A more realistic REGION size will result in reduced charges and more efficient use of the system.

Finally, users should remember to include a /*SETUP statement in programs which have a REGION size in excess of 300K. The /*SETUP card will aid the UTCS operator in scheduling the job so that the user will receive the best throughput at

cont'd...

PROGRAMMING TIPS cont'd

the lowest cost.

It is hoped that users will benefit from the programming suggestions outlined above. Questions regarding this article should be directed to Herb Kugel at 978-7286 or any UTCS Computing Co-ordinator.

Herb Kugel

3330 PRIVATE PACK CATALOGUE RESTRICTION

Users who wish to catalogue datasets on their own packs should contact UTCS in order to arrange for building the proper index pointers in the protected Master Catalogue. This special restriction has been placed on cataloguing private packs in order to prevent too much transient information from being placed in the Master Catalogue. A Master Catalogue which is cluttered up with obsolete data results in poor system throughput.

To catalogue datasets on a private pack, contact a Computing Services Representative or Herb Kugel at 978-7286.

Herb Kugel

SAS 79 IS HERE

SAS 79.2 is now available at UTCS on the IBM 3033 Processor. Although 79.2 is intended to be a test system until the arrival of 79.3 sometime in the fall, UTCS will make 79.2 the default version of SAS in the near future. SAS 79 is advertised as completely upwards compatible with SAS 76, so users not wishing to take advantage of the new features can continue to run jobs without changes. (// EXEC SAS will give the current default.) Users wishing to take immediate advantage of the new release can use it by coding // EXEC SAS79 . For the more cautious, SAS 76 will continue to be available on the system until SAS 79.3 arrives. SAS 76 can be accessed by coding // EXEC SAS76 .

The corresponding TSO commands are SAS, SAS79, and SAS76, with SAS giving the current default version. (To re-enter use SASGO, SASGO79 and SASGO76). On TSO, the SASSORT command is no longer needed and there is a SASBMDP command for using BMDP programs semi-interactively. On TSO, help is available for SAS79, SASGO79 and SASBMDP. Highlights of SAS 79 are:

1. IF-THEN-ELSE and DO-END have been implemented. These constructions allow neat structured programs of the type IF logical-expression THEN DO; statements; END; ELSE DO; statements; END;

2. Arrays can be defined and DO loops used to process them.

cont'd...

SAS 79 IS HERE cont'd

3. New functions are available to handle character strings. Character to numeric conversion and numeric to character conversion are automatic. Varying length strings can be input and blanks can be converted to zeros on input.

4. Sorting large datasets should be easier as SAS now interfaces with the MVS ICEMAN sorting program. It is no longer necessary to specify the size of sort work datasets in Batch or to use the SASSORT command in TSO.

5. A canonical correlation procedure, CANCORR is now available.

6. FUNCAT is a new procedure which allows the use of categorical responses in linear models.

7. New utilities are available to copy SAS datasets and handle tapes.

8. A new UNIVARIATE procedure is available and can be used to produce statistics more conveniently than PROC MEANS.

9. The BMDP interface is now easier to use.

10. Many procedures had minor improvements made and/or new features added.

The major documentation is now contained in the much improved SAS User's Guide, 1979 Edition which is available at the UTCS Information Office. Anyone with questions or problems should contact John Roth at 978-6878.

John Roth

RECENT ACQUISITIONS IN THE DEPARTMENT OF COMPUTER SCIENCE LIBRARY

Allen, John.
Anatomy of LISP.
New York, McGraw-Hill, 1978.

Atkinson, Kendall E.
An introduction to numerical analysis
New York, Wiley, 1978.

Birkhoff, Garrett and Rota, G-C.
Ordinary differential equations.
3d ed.
New York, Wiley, 1978.

Cohen, Daniel I.A.
Basic techniques of combinatorial theory.
New York, Wiley, 1978.

Dornhoff, Larry L. and Hohn, F.E.
Applied modern algebra.
New York, Macmilan, 1978.

European Cooperation in Informatics Conference, 1st, Amsterdam, 1976.
ECI conference 1976, ed. by K. Samelson
Berlin, Springer-Verlag, 1976.

Fichera, Gaetano.
Numerical and quantitative analysis.
Tr. from the Italian.
London, Pitman, 1978.

cont'd...

RECENT ACQUISITIONS cont'd

Grove, Wendell E.
Brief numerical methods.
Englewood Cliffs, N.J.,
Prentice-Hall, 1966.

Hillier, Frederick S. and
Lieberman, G.J.
Operations research. 2d ed.
San Francisco, Holden-Day, 1974.

Linz, Peter.
Theoretical numerical analysis: an
introduction to advanced techniques.
New York, Wiley, 1979.

MacLane, Saunders and Birkhoff, G.
Algebra. 2d ed.
New York, Macmillan, 1979.

Roberts, Charles E., Jr.
Ordinary differential equations: a
computational approach.
Englewood Cliffs, N.J., Prentice-Hall,
1979.

Thie, Paul R.
An introduction to linear programming
and game theory.
New York, Wiley, 1979.

Wolfowitz, Jacob.
Coding theorems of information theory.
3d ed.
Berlin, Springer-Verlag, 1978.

Workshop on the Portability of
Numerical Software,
Oak Brook, Ill., 1976.
Portability of numerical
software, ed. by W. Cowell.
Berlin, Springer-Verlag, 1977.

UTCS SYSTEMS

3033 PROCESSOR

- located in McLennan Physical Laboratories
- provides General Purpose Job Stream, High Speed Job Stream, TSO, WYLBUR
- 6 megabytes of memory
- MVS with JES2

SYSTEM/370 MODEL 165-II

- located in McLennan Physical Laboratories
- provides APL and ATS services
- 4 megabytes of memory
- OS/MVT with APL and ATS

3031 PROCESSOR

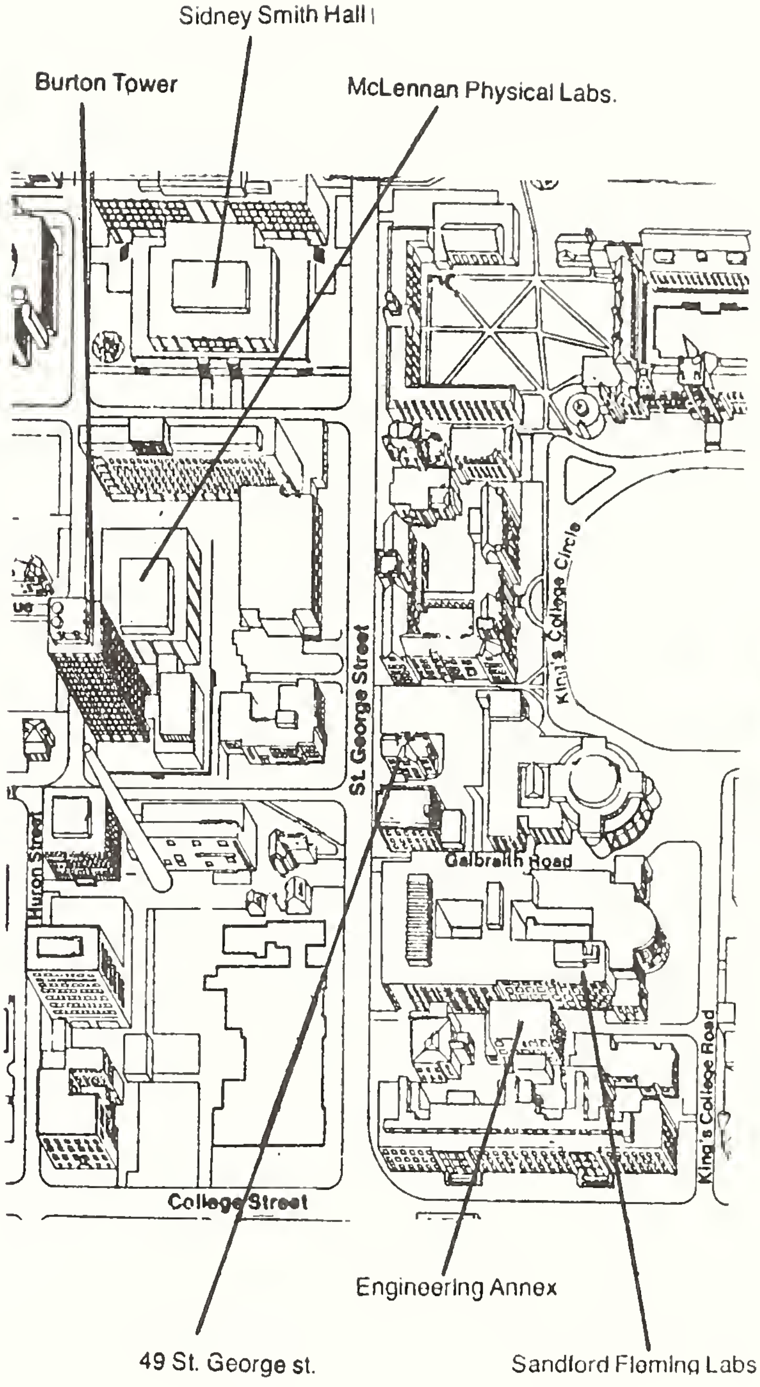
- located in McLennan Physical Laboratories
- provides administrative IMS/VS DB/DC Batch and TSO services
- 6 megabytes of memory
- MVS with JES2

DECSYSTEM 10 Model 1090

- located in Sandford Fleming
- provides General Purpose Time-Sharing
- 256k - 36 bit words of memory
- TOPS10 operating system

COMMUNICATIONS & SMALL SYSTEMS (CSS)

- located in SF106
- DEC GT44 System with PDP-11/40 CPU
- 2 Z-80 based microcomputers
- provides specialized graphics and interactive graphics
- provides on-line and real-time computing services, data acquisition and minicomputer services



UTCS DIRECTORY

POSITION	ROOM	CENTREX PHONE NUMBER
DIRECTOR		
Dr. Doron Cohen	ML350	8948
ASSOCIATE DIRECTORS		
Rein Mikkor	ML350	5058
Al Heyworth	ML350	4936
FACULTY LIAISON OFFICER		
Dr. Frank Spitzer	ML350	4619
MANAGER, COMMUNICATIONS AND SMALL SYSTEMS		
Eugene Siciunas	ML350	4967
MANAGER, OPERATIONS		
Derry Cox	ML350	7092
MANAGER, SYSTEMS		
Ward Beattie	ML350	3579
MANAGER, ACADEMIC COMPUTING SERVICES		
Ralph Lombardi	ML350	7130
MANAGER, ADMINISTRATIVE COMPUTING SERVICES		
Walter Berndl	ML350	7331
MANAGER, SERVICES SUPPORT		
Don Gibson	ML350	5568
ADMINISTRATIVE OFFICER		
Suzan Fawcett	ML350	4428
INFORMATION & ACCOUNTING OFFICE		
General Inquiries	EA206	4990
ACCOUNTS		
Merton Hunte (U of T)	EA206	8702
Sylvia May (External)	EA206	7148
SUPERVISOR, ACCOUNTING & INFORMATION SERVICES		
Marg Doherty	EA209	3960
ACCESS CODES		
Agatha Stevens	EA206	8703

SUPERVISOR, APPLICATIONS

Herb Kugel	SG304	7286

COMPUTING SERVICES REPRESENTATIVES

Engineering Annex Terminal		
Sue Chong	EA203A	4357
Program Advisors	EA103	
Time-Sharing Support		
TS Advisors	SG204	6465
Mark Tapia	SG204	7109
Erindale		
Paul Shindman		828-5311
Scarborough		
Ihor Prociuk		284-3173
Arts and Science		
	SS2133	6509
New Physics		
Bob Chambers	ML1202	8823

SUPERVISORS, OPERATIONS

Paul Scarborough (IBM 3033-IBM 165)	ML335	6220
Krishna Patnaik (DEC 1090 and CSS)	SF106	4086
Dave Wong (IBM 3031)	ML335	6846

KEY:

EA = Engineering Annex
SG = 49 St. George
ML = McLennan Physical Laboratories
(New Physics)
SF = Sandford Fleming
SS = Sydney Smith

JOB AND SYSTEM STATUS QUERIES

SYSTEM/3033,TSO	7373
ATS/APL	6234
2741 TERMINAL MALFUNCTIONS	7107

TIME-SHARING SERVICES	DIAL-UP
APL,ATS	7200 CENTREX 7201 NON CENTREX
TSO,WYLBUR	6200 CENTREX 6201 NON CENTREX
DEC 10 SERVICES	4224 CENTREX 4244 NON CENTEEX
PHONE-IN ADVISING	6465

University of Toronto
Computing Services
Toronto, Canada